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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/792,054	03/02/2004	Avgerinos V. Gelatos		4738

7590 06/09/2005

APPLIED MATERIALS, INC.
Patent Department, M/S 2061
P.O. Box 450A
Santa Clara, CA 95052

EXAMINER

PAIK, SANG YEOP

ART UNIT	PAPER NUMBER
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3742

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/792,054

Applicant(s)

GELATOS ET AL.

Examiner

Sang Y. Paik

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
4a) Of the above claim(s) 25-31 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-24 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7, 8, 11-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US 6,423,949) in view of Chang (US 5,916,370) or Berkman et al (US 4,090,851), and Brown et al (US 6,046,758) or Todd (US 6,630,413).

Chen shows a substrate processing chamber with a substrate support having a ceramic block made of aluminum nitride with a pocket to receive a substrate therein, a plurality of independently controlled resistance heaters having 2-4 ohms disposed in the ceramic block, the heater leads extending out of the ceramic block and extending through a post. However, Chen does not show the claimed ceramic coating comprising an amorphous Si-H-N-O compound.

Chang shows a ceramic support provided with a protective coating to further protect the ceramic support. Berkman also shows it is known in the art to provide a protective coating such as silicon nitride over a ceramic support. Berkman also teaches that silicon nitride provides good mechanical and chemical resistance as well as good thermal conductivity.

Brown shows an amorphous protective coating comprising Si-H-N-O compound to produce a highly wear and abrasion resistant coating. Brown further shows that the protective coating can be in the range of .5-20 microns. Todd also shows the amorphous silicon nitride

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material having Si in the range of 40-99.5 wt %, N in the range of .25-40 wt %, O in the range of 0-49.9 wt %, and H in the range of 20% or less of the silicon nitride.

It would have been obvious to one of ordinary skill in the art to adapt Chen with the teachings of Chang and Berkman to provide the ceramic block with a protective coating including silicon nitride to further enhance the mechanical and chemical resistance, and further adapt with the teachings of Brown and Todd with the coating comprising Si, H, H and O to produce a mechanically and chemically strong protective coating.

3. Claims 6, 9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of Chang or Berkman, and Brown or Todd as applied to claims 1-5, 7, 8, 11-15 and 17 above, and further in view of Burkhart et al (US 6,469,283) or Tachikawa et al (US 6,376,808).

Chen in view of Chang or Berkman, and Brown or Todd shows the structure claimed except an electrode in the ceramic block.

Burkhart and Tachikawa show it is well known in the art to provide an electrode in the ceramic body. In view of Burkhart or Tachikawa, it would have been obvious to one of ordinary skill in the art to adapt Chen, as modified by Chang or Berkman, and Brown or Todd, with an electrode in the ceramic body to electrically attract or chuck an object such as a wafer to the heating surface of the ceramic support.

4. Claims 10, 18-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of Chang or Berkman, and Brown or Todd as applied to claims 1-5, 7, 8, 11-15 and 17 above, and further in view of Ishii (US 5,851,298) or Hwang (US 6,009,831).

Chen in view of Chang or Berkman, and Brown or Todd shows the structure claimed including a process chamber, a gas distributor, a gas exhaust, and the controller having programs

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to independently control the heating elements. However, Chen does not show a gas energizer such as RF generator or microwave generator.

Ishii shows it is known in the art to provide a microwave generator to generate microwave that would consequently generate magnetic field with the magnetic coil with the process chamber to excite the gas introduced therein. Ishii further shows using the electrodes in the ceramic block for the RF electrodes. Hwang also shows it is known in the art to use the showerhead in the gas processing chamber to as the RF electrode and the electrode in the ceramic body support substrate as another RF electrode to generate the RF there between.

In view of Ishii or Hwang, it would have been obvious to one of ordinary skill in the art to adapt Chen, as modified by Chang or Berkman, and Brown or Todd, with the gas energizers such as the RF or microwave generator to excite or energize the gas in the chamber to further enhance the desired process.

Response to Arguments

5. Applicant's arguments filed 3/22/05 have been fully considered but they are not persuasive.

The applicant argues there is no motivation to combine the prior art. The applicant argues that since Chen does not show the use of a coating, one of ordinary skill would not have been motivated to combine with Chang or Berkman which does not teach the amorphous Si-H-N-O, and furthermore Brown and Todd which shows the Si-H-N-O are non-analogous art, it would not be combine.

Examiner does not contend that Chen has the claimed coating. In fact, Examiner acknowledges that it doe not have such claimed coating. However, as Chang teaches that a

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ceramic substrate that is used in a CVD which is exposed to a high thermal temperature is coated with a protective coating to protect the ceramic support from the chemicals. Berkman also shows providing a ceramic crucible with a protective coating to protect crucible that is exposed to a high temperature and prevent contamination with other processed chemical in the crucible. Both prior art teaches that providing a protective coating to a ceramic substrate that is used in a chemically reactive environment, and it would have been obvious to one of ordinary skill to take advantage of such protective coating to further protect the ceramic substrate of Chen which uses its ceramic substrate in the CVD processing chamber. Brown and Todd shows that the amorphous Si-H-N-O is used as a protective coating which can also provide a highly wear and abrasion resistance in a chemical processing environment such as the thermal print heads processing heat-sensitive chemicals and etching process as shown in Brown and Todd, respectively. In view of Brown and Todd which teaches using the claimed amorphous materials as a protective coating, one of ordinary skill in the art would also have been motivated to combine such teachings in Chen with the teachings of the Chang and Berkman.

The applicant's argument that prior is non-analogous art is deemed unpersuasive since the prior art relate as being in the same field of endeavor which is in the field of processing chemicals in a high thermal conductive devices and they are also reasonably pertinent to the problem with which the applicant was concerned of which is to chemically and thermal protect the ceramic substrate in a chemical processing environment.

It is noted that Burkhardt, Tachikawa, Ishii and Hwang were not applied to teach the claimed amorphous material but the claimed electrode and the RF or microwave generator as stated in the ground of rejection.

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6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Y. Paik whose telephone number is 571-272-4783. The examiner can normally be reached on M-F (9:00-4:00) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Paik

Sang Y Paik
Primary Examiner
Art Unit 3742

syp